

SYNTAX

SERVING TIMEX-SINCLAIR
PERSONAL COMPUTERS

A PUBLICATION OF **THE HARVARD GROUP**

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TS1500, MODEM DELAYS

Timex manufacturing chief Carlos Dragovich says Timex now plans late August releases of both TS1500 and TS2000 models. Timex said last month it planned July sales for TS1500s, and August sales for TS2000s. Dragovich projects modem delays until late September, instead of August as announced earlier. But industry observers expect further delays on all new products, and report from the June Consumer Electronics Show that widespread dealer skepticism exists towards Timex. The reasons--inadequate product deliveries last winter and sharp price-cutting by Timex.

SOFTSYNC READY WITH TS2000 SOFTWARE

Softsync says it's ready whenever Timex is, with TS2000 software now for sale. Their 11 programs include games, utilities and machine code, priced from \$19 to \$22. Softsync also plans accounting programs and a synthesized voice game from England.

SINCLAIR TECH LINE OVER, PLANS THINK-TANK

Sinclair Research no longer provides technical information by phone. Mail your written questions to 4 Sinclair Plaza, Nashua, NH 03061. Sinclair reports it plans this fall to open Metalab, a \$3 million "think-tank" in the UK. Metalab's work will include robotics and battery technology.

MEMOTECH ANNOUNCES NEW COMPUTER

Memotech Corp. has announced a new computer which will reach stores in October. The 16-color Z-80 based unit, known as the MTX 512, holds 80K RAM, uses CP/M, Apple, IBM and Memotech's own software, can drive a TV and monitor simultaneously, knows several languages, and uses plug-in cartridges (disk-drive optional). Price: \$500-\$600.

SQ-UP

John Oliger reports an error in his 64K RAM board project in Summer SQ. Schematic 1, p.47 (MC mod), shows pins 1 & 13 tied to GND. Tie both to Vcc to make the circuit work.

NEW PRODUCTS AND SERVICES

ZX PRO/FILE, a ZX/TS MC data base, provides access to files configured in any size. Offers single or multi-word cross searches, ordered file output, assorted printer functions, and cursor-driven ADD/EDIT modes. \$16.95, Tom Woods, Box 64, Jefferson, NH 03583, 603/586-7734.

New TS2040 paper source: 4 rolls blue print on white, \$7.80; 4 rolls black on white \$9.15. Kopak, 119 Peter St., Union City, NJ 07087.

Z-Extender toolkit adds six new MC commands to Sinclair BASIC: RENUMBER, INVERSE, BORDER, UNBORDER, FILL, BYTES (tells remaining free memory), needs 16K RAM \$4.95. NVM Toolkit for 2K or greater Hunter NVM board provides seven MC commands. \$4.95. L. Harmon, 4909 Clearlake Dr., Metairie, LA 70002.

MD5500 mod now available for DARKSTAR darkroom program, sets correct exposure time and filter settings for print-making. Needs 32K and Centronics I/F. \$15. R. Martin, f/22 Press, POB 141, Leonia, NJ 07605, 201/568-6250.

For the executive with everything--KEYSTROKE MANAGEMENT, four 2K office games: Musical Desks, Corner Office, Office Automation, Go To The Top. \$14.95+6% tax for CA res., 2-BIT SOFTWARE, POB 2036, Del Mar, CA 92014, 619/481-3629.

TS1000 64K RAM module, 4-1/2"x3" (width by height). \$99.95 kit, \$109.95 built and tested, 2-3 weeks delivery. Barlog Software, 401 N. Geyer Rd., Kirkwood, MO 63122.

COMPUTER NAVIGATION programs give you great circle sailing, dead reckoning, rhumb-line, planet identification. Seven programs on one 16K tape, \$19.95 PP. From Celestial Software, 3010 Warrington Ave. Lakeland, FL 33803, 813/686-3311.

"PLUMB--Probing the World of Personal Telecommunications," newsletter about online databank services. Covers electronic mail, online games. \$20 for five 1983 issues. Write Riverside Data Inc., POB 300, Harrods Creek, KY 40027.

SCREEN MACHINE--MC utility lets you input anywhere on screen. Occupies 1.5K, use with 16K. Vu-Write TEXT EDITOR holds 370 lines. Set up for ZX printer but modifiable for any printer. Includes insert, delete, save, change functions. Each item \$14.95 + \$1 P&H. SyncMaster, POB 511, Oak Ridge, NC 27310, 800/334-0854, in NC 919/643-7120.

Call with TS-related questions--SSgt. Patrick Spera of Sinclair Computer User's Group of OK is now SYSOP of TS database on CEM-SIG (Computer and Electronics Magazine Special Interest Group), part of CompuServe Info. Service. CompuServe subscribers GO CEM 450 at any prompt to reach SIG, leave message to SYSOP/PATRICK (P.M.) 74125,552.

CRC Smart Soft-Face interfaces ZX/TS to any serial or parallel printer without RAM or user routines, allows upper/lower case. Send printer model, pin out, plug needs. \$109.95. 16K program catalog \$1, refundable with order. CRC Software, 2901 Auburn Rd., Auburn Hgts., MI 48057, 313/852-3711.

BEST Timex Computer Coach instructional programs introduce you to your computer, includes audio tape. \$19.95 each, quantity discounts, Boston Electronic Systems Training, 24 Munroe St., Newtonville, MA 02149, 617/969-BEST.

SCYON'S REVENGE 3-D fast action arcade-type space combat, THE PROGRAMMING KIT I (teaches BASIC), 5-2K FAMILY PAK (household programs), \$12.95-\$19.95. TIMEWORKS, INC., 405 Lake Cook Rd., Bldng. A, Deerfield, IL 60015, 312/291-9200.

Sinclair ZX81/Timex Sinclair 1000 Statistics: Twelve 16K Programs Including Multi-Factor Analysis of Variance, by A. Wolach, M. McHale, contains 12 statistical programs, \$11 book; tape, \$1.50/program, \$15 for all 12. K.D.V.H.E. Publishers, POB 6788, Chicago, IL 60680.

On Sale--2K Graph-it! Pie Chart \$7.95 till Jul. 15, regular price \$9.95. Starburst Software, 2214 Horine Rd., Festus, MO 63028.

User groups, students, colleges, schools, non-profit organizations, libraries, publications: discounts on software, peripherals, printers. Intercomputer, Inc., POB 90, Prudential Center, Boston, MA 02199, 617/437-1190.

HAWG WILD Software offers 10% off to user group members who preregister by sending group name, address and name of contact person. Also seeking unpublished original software. For further info., contact HAWG WILD Software, POB 7668, Little Rock, AR 72217.

LEDGER, double-entry bookkeeping program, combination journal and ledger. Needs 16K RAM but expands to extra memory, 16K yields more than 100 transactions, 32K more than 700, single entry to accounts. Tape \$10 ppd. D. Lipinski Software, 2737 Susquehanna Rd., Roslyn, PA 19001, 215/572-6812.

POLYMATH 16K, solves and checks math equations including quadratic, cubic, factors numbers, solves for x and y, evaluates polynomials. \$19.95 ppd., POLYMATH, POB 800, Felton, CA 95018.

3-D Graphics create 360-degree wire frame object, lets you move to any location inside and look in any direction, 16K. \$2+SASE for listing. STOP SELF RUN PROGRAMS does just that, \$1+SASE from Russell Brewer, 26630 Mill Rd., Frazeyburg, OH 43822, 614/668-2700.

TEXTWRITER 1000--a word processing program with 1400-word capacity, includes line/character addition, deletion, auto margin wrap, block memory, tab, user-defined file size, supports ZX & Timex printers. \$11.95 tape, \$5.95 listing. Bob Fingerle, Box 7793, Fremont, CA 94537-7793.

SoftwareLand Corp. announces opening of first three SoftwareLand retail stores. Carries TS software. Grand opening June 30 in Scottsdale, Mesa and Phoenix, AZ. SoftwareLand Corp., 2629 Scottsdale Rd., #201, Scottsdale, AZ 85257, or call Doug Roth, 602/248-8080.

ZX/TS USERS' GROUPS

Lumberton, NC: Tripp Brown, 502 Sandlin Dr., Lumberton, NC 28358, 919/739-2767.

San Francisco, CA: Timex Sinclair Users Nationally Active Megagroup, Inc., Walt Gaby, 3325 Pierce St., San Francisco, CA 94123.

Cleveland, OH: Timex Sinclair Users Group of Cleveland, R. F. Sieg, 19502 Thornridge Ave., Cleveland, OH 44135, 216/433-4387 (home), 281-2211 ext.319 (work).

Kansas City, MO: Carl E. Mutch, 4701 NW Linden Rd., Kansas City, MO 64151, 816/587-8820. NOTE: Col. Ralph Goodell no longer runs the Kansas City Users Group, as listed in SYNTAX (Jun.83).

Pittsburgh, PA: Thomas R. Byrer, 140 N. Wren Dr., Pittsburgh, PA 15243, 412/279-2260.

MODULES FOR:

TIMEX-Sinclair

MODEM \$119.⁹⁵ KIT (RS-232) Port & Software Included) \$149.⁹⁵ ASSEMBLED



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- Reset Switch
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 3
 

San Francisco Bay Area, CA: SFBA T/S Users Group has changed its name to the South Bay Timex/Sinclair User Group, and has formed an Association of Greater Bay Area Timex User Groups. Contact Paul D. Perrault, 947 Clara Drive, Palo Alto, CA 94303, for information about both groups.

Elkhorn, WI: Robert M. Colvin, 124 N. Church St., Elkhorn, WI 53121, 414/723-3354.

VENDOR REPORT AND NOTES

Bob Berch of 19 Jaques St., Rochester, NY is changing his name to Cinagro Software effective July 1. New address: 155 Seventh St., Rochester, NY 14609. You can send mail to both addresses until early fall. Bob's ZX Compilers now cost \$25 (up from \$20 as of March 1) and Assembler/Disassembler programs (both on one cassette) cost \$25, effective July 1.

DJM is now Starburst Software, at 2214 Horine Rd., Festus, MO 63028.

Proprietary International reports that printing snafus delayed mailing of ZXPress Compiler manuals. Randy Wear of PI says they will fill all back orders by July 1, at the old price of \$29.95. New price is \$39.95. Contact Randy at 608/255-2325 if any problems.

Zebra Systems says they are back-ordered on light pens, but should be caught up by July 1. Zebra Systems, Inc., 78-06 Jamaica Ave., Woodhaven, NY, 212/296-2385.

Brainchild's Gwen Marsh says the company plans to ship back-ordered Kolorworks on July 15. Parts unavailability caused shipping delays, according to Gwen.

Mindware reports they're trying to interest someone else in awarding the Rosetta Stone for best TS products this year, but have not confirmed details by press time.

Printer, paper discounts: TS2040 printer--\$73.88, 3 rolls of paper--\$6. \$4+long SASE for referrals to suppliers, \$1+SASE for paper referral only. ZX Users Group of NY, POB 560, Wall St., NY, NY 10005.

PROGRAM IMPROVEMENT

Change or add the following lines to improve video effects (extra "smoke" from train smokestack) in LETTER RECOGNITION TRAIN (Jun.83).

Spacing:

Line 330 begins with four spaces.
 Line 333 begins with three spaces.
 Line 355 contains five spaces. All other spacings are one space only.

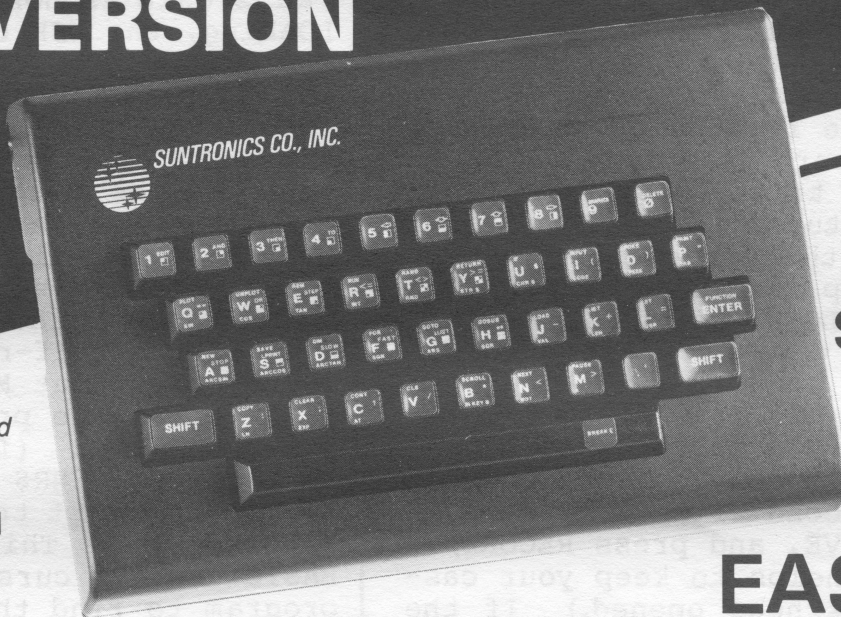
```

030 PRINT AT 0,N:"
033 PRINT AT 0,N:"
055 PRINT AT 0,0:"
065 PRINT AT 0,5:"
075 PRINT AT 0,5:"
  
```

Patrick Moeller, Lowry AFB, CO

FULL SIZE KEYBOARD CONVERSION

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- Allows touch typing
- Rear cutout allows any RAM or expansion module to be plugged in
- Keyboard comes with own cables
- Keyboard case holds both keyboard and computer with room to spare
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- Easy assembly — no soldering, no modifications
- Measures 10³/₄" x 7¹/₄" x 2¹/₈"

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- No Modifications

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steps included
with
each
kit.

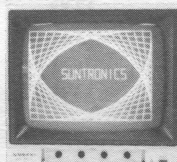


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64K \$119.00 MX-64KP



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SAVING UNSAVEABLE PROGRAMS

How do you back up programs you can't BREAK into, like machine code (MC) or self-running programs? You know the importance of back-ups if you or your tapes ever malfunction. This trick LOADs any program and then returns to BASIC, without activating the error detector.

Hook up both EAR and MIC plugs so you can LOAD then SAVE. Put the tape in the tape deck without turning it on.

SAVE CHR\$ USR 832"program name"

You must change tapes quickly in the 5-second silence between LOAD and SAVE, and press RECORD/PLAY. (It helps to keep your cassette deck's hood opened.) If the program self-runs, it executes after finishing the SAVE.

How does it work? USR 832 calls the ROM LOAD subroutine, and the two quotes hold the program name. (You can also type "" with

no program name. The computer reads this as LOAD "".) After LOADING, the USR call RETURNS to BASIC to finish the line, evaluating to zero. CHR\$ changes the zero into a string. The line reads SAVE "" (CHR\$ of 0 is the space character) and the computer SAVES the program. For SAVE and LOAD, the syntax checker looks only for a quotes and any string, so the computer accepts the line and SAVES.

SAVE a self-running program (with or without MC) by pressing BREAK after the program LOADs and starts to RUN. (If you can't BREAK in here, try CHR\$ XX in response to an input prompt to get an error report.--LFV) This RETURNS you to BASIC and a K cursor. LIST the program to find the line SAVE "program name." GOTO this line to SAVE the program under its name.

These methods worked on all my unSAVEable programs.

Gary Preston, Glade Hill, VA

THE INS AND OUTS OF THE 

TIMEX TS 1000 & ZX 81



DON THOMASSON

A HARDWARE MANUAL FOR TS 1000 & ZX 81

At last a reference manual which covers all the hardware aspects of the TS1000 - includes complete circuit diagrams!

Orders to: **MELBOURNE HOUSE SOFTWARE**
Dept. CS 347 Reedwood Drive, Nashville, TN 37217

Dealer orders and queries: 800/251-5900
(ask for a Melbourne House operator)

Visa and M/C orders
can be phoned in: 615/361-3738

BOOKS:

- 25895 The Complete Basic Course \$34.50
- 25957 Machine Language Programming Made Simple \$14.95
- 20922 The Complete Timex/Sinclair ROM Disassembly \$19.95
- 26025 Not Only 30 Programs \$9.95
- 25913 Understanding Your ZX81 ROM \$14.95
- 51539 Ins and Outs \$12.95

TAPES:

- 13941 Gamestape 1: 11 Programs -1K \$14.95

- 13942 Gamestape 2: 3 Games -16K \$14.95
- 13943 Gamestape 3: Catacombs Adventure -16K \$14.95
- 13944 Gamestape 4: 3D Monster Maze -16K \$14.95
- 13945 Gamestape 5: 3D Orbiter -16K \$14.95
- 26446 Space Trek -16K \$14.95
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- 26318 Wall Busters -1K \$14.95
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- 26284 Reversi -1K \$14.95
- 26406 Toolbox -1K \$14.95
- 26490 Basic Course 2 cassette pack \$7.50
- 14026 Combat Flight -16K \$14.95

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Add \$2 for Shipping & Handling,
foreign orders add \$6: _____

TOTAL: \$ _____

STX7

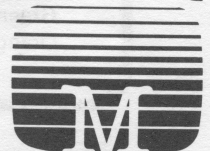
Enclosed is my check or money order for \$ _____

Please charge my Visa or MasterCard Card # _____ expiration date _____

Signature _____ Name _____

Address _____ City _____ State _____ Zip _____

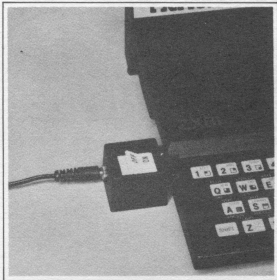
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HARDWARE REVIEW—TWO INEXPENSIVE POWER BACKUP SUPPLIES

Product: SVR-2

From: Luxtron Inc.
241 Winter St.
Haverhill, MA 01830

Price: \$17.50

Power Life: 30 min. (16K) with alkaline batteries

Product: UPS-1

From: UPSystems
PO Box 501901
Houston, TX 77250

Price: \$16.95

Power Life: Not stated

Sudden fluctuations in the AC power line voltage (called "transients") can cause your computer to malfunction or crash. Both SVR-2 and UPS-1 prevent power loss from transients or total power failure.

These products contain many similarities in design, price and performance, and both offer an in-

expensive way to guard against power irregularities or outages. A small black plastic box about 5x3x2" high houses each unit. You plug the cord from your AC power supply into the unit, and then connect the unit and 9V DC computer jack with the second cord included with purchase. A single on/off switch controls the power to your computer. In the event of an AC power failure, the battery activates to maintain power supply.

I tested each unit by turning the power switch on, loading a program and then unplugging the AC power supply. The program remained intact, and I could SAVE it. Remember to keep extra tape deck batteries in case of power failure.

SVR-2 sports three features that make it preferable to UPS-1. First, SVR-2 provides a visual cue via an on/off light near the switch to indicate whether the computer receives power, while UPS-1 carries no such indicator. Second, SVR-2 provides a longer cord than UPS-1 (5 ft. vs. 23"). Finally, SVR-2's button switch operates easier than UPS-1's toggle switch.

Another plus for SVR-2: It arrived within three weeks of my order. My UPS-1 required waiting over three months and sending several letters to the manufacturer.

Drawbacks to SVR-2: My ZX printer operates very slowly with the SVR-2, although printout remains the same. Also, Luxtron does not warranty the SVR-2, while UPS-1 comes with a written, 90-day, limited warranty.

John B. Carson, Takoma Park, MD

Bill Slusher of Luxtron suggests using a larger power supply to prevent printer slowdown. Slusher adds he will warranty SVR-2 for 30 days. Luxtron also sells SVR-1 using rechargeable Ni-Cad batteries for \$49.00 including built-in battery charger and batteries. We could not contact UPSystems.--LFV

GOLF PARTNER--8K/16K

GOLF PARTNER stores your golf scores and calculates your average and handicap. The program holds information for 100 rounds of golf, and calculates the statistics after your first ten entries.

Non-golfers--learn programming tricks from GOLF PARTNER. Line 425 clears the screen automatically when the display fills, preventing error report 5 so you don't need to press CONTInue to go on.

To enter line 0 (not normally accepted on the ZX/TS), enter 1 REM followed by the text. Then type with no line number: POKE 16510,0 and press ENTER. You now have an undeditable line 0.

For your first entry, GOTO 900 to DIMension all arrays and set the first date entry equal to END, telling the computer to start taking information at line 1. The program then returns to the menu, and self-runs after that.

Choose from three options: ENTER NEW DATA, VIEW PAST DATA and SAVE TO TAPE. Press 1 to enter data. (Go directly to this option to add all future entries.) Type in the date, golf course name, number of holes and score as asked. Type END to see the menu again. After ten rounds of golf, press ENTER to see your average and handicap. As you add entries, GOLF PARTNER calculates statistics based on the ten most recent rounds.

Variables

D\$=Date array

C\$=Course name array

N=Holes completed array

S=Score array

Z\$=Input (or any choice)

O\$=Menu selection

O=Value of O\$

L=Line counter; subscript

X=Control variable (handicap)

T=Total strokes

A=Average score

H=Handicap

Rev. Joseph Glass, Cinnaminson, NJ

```

0 REM --GOLF PARTNER
  BY JOE GLASS. (C)1983

20 REM
30 REM
40 REM
50 REM --GOTO 900 ON FIRST TRY
60 REM
70 REM
80 REM      D$=DATE
90 REM      C$=COURSE
100 REM     N(L)=HOLES COMPLETED
110 REM     S(L)=SCORE
120 SLOW
130 GOTO 100
140 REM
150 REM --CLEAR ROUTINE
160 REM
170 CLS
180 PRINT
190 RETURN
200 REM
210 REM --RETURN TO MENU OPTION
220 REM
230 PRINT AT 21,0:"KEY ENTER TO
CONTINUE"
240 INPUT X$
250 GOTO 100
260 REM
270 REM --OUTPUT FORMAT ROUTINE
280 REM
290 PRINT TAB 2;"DATE";TAB 11;"
COURSE";TAB 21;"HOLES";TAB 27;"S
CORE"
300 PRINT TAB 2;"----";TAB 11;"
----";TAB 21;"-----";TAB 27;"-
----"
310 PRINT
320 RETURN
330 REM
340 REM --START HANDICAP ROUTIN
E
350 REM
360 PRINT AT 21,0:"KEY ENTER FO
R YOUR STATISTICS"
370 INPUT Z$
380 GOTO 700
390 REM
400 REM --MAIN MENU
410 REM
420 GOSUB 20
430 PRINT " GOLF PARTNER
T E 1988 "
440 PRINT AT 7,8;"1 ENTER NEW D
ATA"
450 PRINT AT 9,8;"2 VIEW PAST D
ATA"
460 PRINT AT 11,8;"3 SAVE TO TA
PE"
470 PRINT AT 17,0;"
"
480 PRINT AT 21,0;" OPTION? "
490 INPUT O$
500 IF CODE O$<29 OR CODE O$>31
THEN GOTO 130
510 LET O=VAL O$
520 GOTO O*200
530 REM
540 REM --REPRINTS HEADINGS
550 REM
560 GOSUB 20
570 GOSUB 60
580 RETURN
590 REM

```



```

198 REM --ENTER NEW DATA
199 REM
200 GOSUB 20
205 FOR L=1 TO 100
206 IF D$(L,1 TO 3)="END" THEN
GOTO 209
207 NEXT L
209 PRINT "LAST ENTRY WAS ON: "
;D$(L-1)
210 PRINT "ENTER NEW DATA";TAB
0;"TYPE ""END"" TO STOP"
211 PRINT "
"
215 PRINT "ENTER THE DATE (EG.
1/28/81)"
220 INPUT D$(L)
225 IF D$(L,1 TO 3)="END" THEN
GOTO 100
230 GOSUB 20
235 PRINT "ENTER COURSE NAME"
236 PRINT "
"
240 INPUT C$(L)
245 GOSUB 20
250 PRINT "HOLES COMPLETED (9 0
R 18 ONLY)"
255 INPUT N(L)
260 GOSUB 20
265 PRINT "ENTER YOUR SCORE"
270 INPUT S(L)
275 GOSUB 20
280 LET L=L+1
285 IF L>100 THEN GOTO 100
290 GOTO 210
397 REM
398 REM --VIEW PAST DATA
400 GOSUB 20
405 GOSUB 60
410 FOR L=1 TO 100
415 PRINT D$(L);TAB 9;C$(L);TAB
23;N(L);TAB 28;S(L)
420 IF D$(L,1 TO 3)="END" THEN
GOTO 60
425 IF PEEK 15442<4 THEN GOSUB
150
430 NEXT L
435 GOTO 40
597 REM
598 REM --SAVE TO TAPE
599 REM
600 GOSUB 20
605 PRINT "ALL DATA WILL BE SAV
ED IN THE STANDARD T/S 1000 FO
RMAT... KEY ENTER WHEN READY
"
610 INPUT X#
615 SAVE "GOL"
620 GOTO 100
697 REM
698 REM --HANDICAP FORMULA
699 REM
700 GOSUB 20
705 LET X=1
710 LET T=0
711 REM
712 REM --NEXT TWO LINES ADJUST
SCORES TO THEIR 18
HOLE EQUIVALENT.
713 REM
715 IF N(L-X)=18 THEN LET T=T+5
(L-X)
716 IF N(L-X)=9 THEN LET T=T+(2
*5(L-X))
720 LET X=X+1
725 IF X=11 THEN GOTO 735
730 GOTO 715

```

```

735 LET A=T/10
740 LET R=A-72
745 LET H=INT (R*.85)
746 PRINT "BASED ON YOUR LAST T
EN ROUNDS:"
747 PRINT
748 PRINT
749 PRINT
750 PRINT "TOTAL STROKES=";T
755 PRINT "AVERAGE=";A
760 PRINT
765 PRINT
770 PRINT "YOUR HANDICAP IS ";H
775 GOTO 40
897 REM
898 REM --INITIAL SET-UP
899 REM
900 DIM D$(100,8)
901 DIM C$(100,12)
902 DIM N(100)
903 DIM S(100)
904 LET D$(2)="END"
905 GOTO 100
2000 REM
2001 REM --(C)1983. GLASSWARE.
2004 REM
SYNTRACTIC SUM: 33644, 8K ROM

```

PENNY GAMBLER--8K/16K

Have some fun playing poker with your computer-naive neighbor. Don't worry about losing--the computer cheats. If you know its tricks, this game keeps track of both honest and dishonest winnings.

Type in the program, then RUN and ENTER. Gamble as instructed. After each round, the computer dishonestly states "You owe me (total amount bet by both players)." But remember two secrets your opponent does not know. 1) When the period is missing at the end of "Sorry you lost your bet." (which appears after every round), your opponent actually won, no matter what the computer says. Of course, you pocket the computer's winnings.

If you answer no to "wanna try again", press 2 as indicated to end the round. A number then appears in the bottom right corner. Secret #2: This number represents the actual amount won or lost. It equals CW minus (OWx5) where CW = the computer's winnings and OW = the opponent's winnings. (You multiply OW by five because the opponent wins an amount five times what he bet.) A negative number means the computer owes your opponent that

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617 / 773-1187

amount (e.g. -20 means the computer pays 20 cents.) A positive number means your opponent owes the computer that amount. (e.g. 20 means the opponent pays 20 cents.)

So start gambling--and let your conscience be your guide.

R.W. Landesman, Phoenix, AZ

```

10 REM "PENNY GAMBLER"
15 PRINT TAB 9;"PENNY GAMBLER"
20 PRINT AT 1,9;" "

25 PRINT
30 LET P=0
35 LET M=0
40 PRINT "WANNA TRY YOUR LUCK."

45 PRINT TAB 5;"YES -- TYPE ""
1"" AND ""ENTER""
50 PRINT TAB 5;"NO --- TYPE ""
2"" AND ""ENTER""
55 INPUT A
60 CLS
65 IF A=1 THEN GOTO 95
70 IF A=2 THEN PRINT AT 7,11;"
CHEAPSKATE"
75 PRINT AT 8,11;" "
80 IF A>2 THEN PRINT AT 7,13;"
DUMMY"
85 PRINT AT 15,0;"TO TRY AGAIN
-- TYPE ""RUN"" AND ""ENTER""

```

```

90 STOP
95 PRINT TAB 9;"PENNY GAMBLER"
100 PRINT AT 5,0;"YOU MAY BET A
PENNY, A NICKEL, OR A DIME. I
110 PICK A RANDOM NUMBER FROM 1
TO 5. GUESS IT AND YOU WIN F
IVE TIMES YOUR BET."
105 PRINT
110 PRINT
115 PRINT "HOW MUCH DO YOU WANT
TO BET?"
120 PRINT TAB 3;"PENNY -- TYPE
""1"" AND ""ENTER""
125 PRINT TAB 3;"NICKEL - TYPE
""5"" AND ""ENTER""
130 PRINT TAB 3;"DIME --- TYPE
""10"" AND ""ENTER""
135 INPUT B
140 IF B=1 OR B=5 OR B=10 THEN
GOTO 160
145 IF B<>1 AND B<>5 AND B<>10
THEN CLS
150 GOTO 95
155 STOP
160 CLS
165 PRINT TAB 9;"PENNY GAMBLER"
170 PRINT AT 5,0;"OK - WHAT'S Y
OUR GUESS 1, 2, 3, 4, OR 5?"
175 LET X=INT (RND*4)+1
180 INPUT Z
185 CLS
190 PRINT TAB 9;"PENNY GAMBLER"
195 IF X<>Z THEN PRINT AT 7,0;"
SORRY YOU LOST YOUR BET."
200 IF X=Z AND B=1 THEN LET M=M
+6
205 IF X=Z AND B=5 THEN LET M=M
+30
210 IF X=Z AND B=10 THEN LET M=
M+50
215 IF X=Z THEN LET X=Z+1
220 PRINT AT 7,0;"SORRY YOU LOS
T YOUR BET"
225 PRINT "YOU PICKED NUMBER
""Z
230 PRINT "THE COMPUTER PICKED
""X
235 IF B=1 THEN LET P=P+1
240 IF B=5 THEN LET P=P+5
245 IF B=10 THEN LET P=P+10
250 PRINT AT 15,0;"WANNA TRY AG
AIN"
255 PRINT TAB 5;"YES -- TYPE ""
1"" AND ""ENTER""
260 PRINT TAB 5;"NO --- TYPE ""
2"" AND ""ENTER""
265 INPUT C
270 CLS
275 IF C=1 THEN GOTO 95
280 IF C=2 THEN PRINT AT 7,12;"
QUITTER"
285 IF C>2 THEN PRINT AT 7,12;"
DUMMY"
290 PRINT AT 9,0;"YOU OWE ME ""
P," CENTS."
295 PRINT "PAY UP NOW. DADDY NE
EDS SOFTWARE."
300 PRINT AT 11,0;" "
305 PRINT AT 20,0;"TO START OVE
R - TYPE ""RUN"" AND ""ENTER""."
310 PRINT AT 21,28;P-M
315 STOP
SYNTACTIC SUM: 44018, 8K ROM

```

DRAW A PICTURE PROGRAM--8K/16K

Draw circles, diagonals and straight lines easily with this drawing program. Type in the program and RUN then ENTER. Begin your design from the blinking pixel in the lower left corner, using the key functions listed in this article. If you want to begin at a different point, press U and hold it down for several seconds. This takes the computer out of the PLOT mode and lightens the blinking pixel. Then move the pixel to the desired beginning point of your drawing. Press P for several seconds to get back into PLOT mode (dark pixel). Now begin drawing with the desired keys. Use this UNPLOT, PLOT, UNPLOT sequence to move the pixel around, and when crossing a line already drawn (to avoid erasing existing lines).

PLOTting continues until you release the directional key. When drawing circles, hold the plotting keys down until finished to prevent circle distortion. Distortion may occur if your circle hits a line.

Pressing BREAK allows you to enter keywords if desired. Hit RUN to begin drawing again.

To plot lines

Keys #5-8 for vertical or horizontal direction. Do not shift.

To plot 45° diagonal lines

Key #4 for left-right upward line
Key #3 for left-right downward line
Key #2 for right-left upward line
Key #1 for right-left downward line

To plot circles

Key C plots counterclockwise
Key D plots clockwise

Function keys

Key R returns blinking pixel to start position in lower left corner
Key P puts computer in PLOT mode
Key U puts computer in UNPLOT mode

Salvatore Curcio, Brooklyn, NY

```
5 SLOW
10 LET A=1
20 LET X=0
30 LET Y=0
40 LET P=A
50 PLOT X,Y
60 UNPLOT X,Y
70 IF P=A THEN PLOT X,Y
80 IF INKEY$="R" THEN GOTO 10
90 IF INKEY$="8" THEN LET X=X+
1 100 IF INKEY$="7" THEN LET Y=Y+
1 110 IF INKEY$="6" THEN LET Y=Y-
1 120 IF INKEY$="5" THEN LET X=X-
1 130 IF INKEY$="4" THEN GOTO 270
140 IF INKEY$="3" THEN GOTO 300
150 IF INKEY$="2" THEN GOTO 330
160 IF INKEY$="1" THEN GOTO 350
170 IF INKEY$="U" THEN LET P=0
180 IF INKEY$="P" THEN LET P=1
190 LET B=1
200 LET N=X
210 LET I=Y
220 IF INKEY$="C" THEN GOTO 390
230 IF INKEY$="D" THEN GOTO 480
240 IF X>=63 THEN LET X=63
245 IF X<=0 THEN LET X=0
250 IF Y>=43 THEN LET Y=43
255 IF Y<=0 THEN LET Y=0
260 GOTO 50
270 LET X=X+1
280 LET Y=Y+1
290 GOTO 240
300 LET X=X+1
310 LET Y=Y-1
320 GOTO 240
330 LET X=X-1
340 LET Y=Y+1
350 GOTO 240
360 LET X=X-1
370 LET Y=Y-1
380 GOTO 240
390 LET X=10+N-10*COS (B/16*PI)
400 LET Y=I-10*SIN (B/16*PI)
410 IF X>=63 THEN LET X=63
415 IF Y>=43 THEN LET Y=43
418 IF X=63 OR Y=43 THEN GOTO 5
0 419 IF X<=0 THEN LET X=0
422 IF Y<=0 THEN LET Y=0
425 IF X=0 OR Y=0 THEN GOTO 50
430 PLOT X,Y
440 LET B=B+1
450 IF B>32 THEN GOTO 50
460 IF INKEY$="C" THEN GOTO 390
470 GOTO 50
480 LET X=10+N-10*COS (B/16*PI)
490 LET Y=I+10*SIN (B/16*PI)
500 IF X>=63 THEN LET X=63
505 IF Y>=43 THEN LET Y=43
508 IF X=63 OR Y=43 THEN GOTO 5
0 509 IF X<=0 THEN LET X=0
512 IF Y<=0 THEN LET Y=0
515 IF X=0 OR Y=0 THEN GOTO 50
520 PLOT X,Y
530 LET B=B+1
540 IF B>32 THEN GOTO 50
550 IF INKEY$="D" THEN GOTO 480
560 GOTO 50
SYNTACTIC SUM: 25758, 8K ROM
```

DEAR EDITOR:

I discovered solutions for two problems published in Dear Editor, (Apr.83). Earl Close of Ontario wanted custom keytops. MULE Electronics, Dept. 310, 444 Lincoln Bl., Venice, CA 90291, sells custom keytops for surplus keyboards to hook up to ZX/TS computers, with schematics and instructions for converting keyboards, for \$9.95 + P&H, 6% tax for CA residents.

Michael Roberts noted a clicking noise ruining programs when SAVEing them with a ZX81, 64K RAM and ZX printer. I experienced the same problem with a modified keyboard enclosure and an added power switch. My ZX printer put out a 5 Hz beat that interfered with the SAVE output--Roberts' click, click. Shielded cable did not help. I bypassed the power switch and put the power plug directly into the computer. This allows me to SAVE cleanly, and prevents the 5 Hz beat from interfering. Program loading remains unaffected with the power switch in use.

Lanny D. Porter, Phoenix, AZ

My TV produces a high-pitched whine and the screen goes blank when I try to LOAD or SAVE. After the program LOADs or SAVEs, I can turn the TV on and continue to run the system. Any suggestions?

Ronald Kline, E.A.F.B., SD

Sounds like a loss of horizontal sync from computer to TV. Try adjusting the horizontal hold control if your set has one. If not, try switching the game coupler to the TV position before you LOAD or SAVE. This should keep your TV from responding badly, though it's not a real cure. Your set may need repair.--KO

Beware of overvoltage conditions ruining your computer or

damaging internal chips. Symptoms of blurry black bands on TV display unlike any LOAD or SAVE characteristic prompted me to investigate their cause. With my oscilloscope I discovered that the unregulated DC input voltage resided on the voltage bus. This should only hold +5V. The culprit--a shorting bridge between the unregulated input and the regulated +5V output bus traces, noticed after careful inspection of the back or foil side of the main PC board. The unregulated voltage passed along the entire board, damaging some ICs. I suspect a tiny metallic particle lodged between the unregulated and +5V regulated trace. I removed the bridge with a razor-sharp knife.

Overvoltage damaged the ULA chip, but luckily the ROM, Z80A, and RAM chips survived. For the future, I will protect my computer by adding a simple overvoltage protection circuit (OVP). This constantly monitors the +5V bus status. If it ever exceeds +6V, the OVP shuts off the power supply, saving the components. See Computers and Electronics (Jun.83, p.40 fig. 1) for a basic OVP circuit.

Tony Gomez, Thousand Oaks, CA

Although paper shortages for the TS2040 appear over, you can try Atari 822 printer paper, which fits TS2040 and CAI P-40 printers.

Thomas Bent, Glen Burnie, MD

Tip for your TS2040: Install a high-quality toggle switch from any hardware store by wrapping either one of the supply cord's two wires inside it, about six to eight inches from the jack. This prevents power supply overheating when you leave it plugged in. Do the same for the computer's power supply and you won't need to fiddle with or wear out the jack.

Maddi Durholz, Westminster, MD

For those of you who cannot find test tapes for azimuth alignment (SQ, Spring 83) at local hi-fi stores, you can get them at Quement Electronics, 1000 S. Bascom Ave., San Jose, CA 95150.

John Andrews, San Jose, CA

After six months of use, my ZX81 began to crash a few seconds after I turned the power on only with Sinclair's 16K RAM pack hooked up. I traced the problem to insufficient filtering in the power supply. I increased capacitance in the pack to 2000 uF by strapping another 1000 uF capacitor across the existing one. Interestingly, TS1000 power supply design includes a 2000 uF capacitor.

Walton B. Caldwell, Cranbury, NJ

My TS2040 printer prints vertical ellipses instead of circles when I COPY, although circle images appear true on the screen. A Timex representative told me the printer works this way. Any solutions?

David Moran, Keene, NH

I don't see a way to really fix this, though you can take account of the rectangular graphic elements by increasing the number of them horizontally or decreasing them vertically. If you use hi-res graphics programs for your printer, you can compensate better at the dot level.--KO

Some observations about Memotech/Seikosha systems: They offer some options not available on ZX/TS printers. For example, type in CHR\$155;"K" to cause a carriage return without a line feed. This feature allows line overprinting so you can do things like underlining.

Although this system prints lower-case characters, they don't look good. Tailed letters like p, q, g and y sit completely above

the line. The coarse 5x7 dot matrix prevents dangling tails.

M/S printers won't print ZX/TS graphic characters. A few, like graphic Q, R and H cause the system to crash or act strangely.

John Wood, Cambridge, MA

At SYNTAX, we noted that CHR\$ 129 causes the entire system to crash. See Jeff Pack's review of the Memotech Parallel Interface and Seikosha GPL00A Printer (SQ Spr.83).--LV

How can I move the code in the 2K EPROM of the Memopak HRG into RAM so I can alter it?

David L. Vessell, Festus, MO

It's always possible to move code from one location to another. Just POKE the new location with the PEEK of the old location.

```
FOR I=A TO B
POKE I+C, PEEK I
NEXT I
A, B=start, & end of old addresses
C=diff. between old-new addresses
This lets you modify the code, but
it may not run in the new location.
If the code uses fixed addresses
for jumps, calls or data, change
addresses; then move the code.--KO
```

Paul Hunter not only manufactures an excellent product, but also extends unusual courtesies to those who buy his 8K nonvolatile memory. A recent order and query returned with a personal letter from Paul including references to published articles in response to my question.

Hunter obviously believes in the brotherhood of man and conducts himself accordingly. Let's hope may others will follow his example.

Irving Helbling, Altadena, CA

Contact Paul at 1630 Forest Hills Dr., Okemos, MI 48864.--LFV

SOFTWARE REVIEW

Program: ZX Scramble
Price: \$14.95
ROM/RAM required?: 8K/16K
Printed listings?: No
Program listable?: Yes (see text)
Language: MC and BASIC
From: International Publishing
& Software, Inc.
3952 Chesswood Dr.
Downsview, Ontario,
Canada M3J 2W6

ZX Scramble, a crude version of the classic Defender arcade game provides middling good home video game action. Your ship, an "X" graphic character, travels through a 2-D maze and must destroy "O" targets using "\$" bombs or "-" laser bolts. Periodically launched enemy ships "+" attack you.

Three different game segments comprise the action. By the second, the maze gets tougher and only split-second timing carries you through. In the third scenario, enemy "planes" swarm around you.

Use options of ten or one life to vary the playing skill level, with one life the toughest. Our young "pinball wizard" passed through the maze unscathed after about four hours of constant play, using ten lives. LIST the program to change the number of lives to any amount desired.

Another advantage: Although you get only one game copy, you can SAVE the program to make backups.

Disadvantages stem from the computer itself. You must use 11 keys in all, and contend with the annoying lack of tactile and acoustic feedback. Inability to modify more game parameters with POKEable variables creates another problem. But worst of all, you look at infrequent, boring graphics.

You can LIST ZX Scramble except for the entire first MC REM, which runs too long for one screen.

Paul Donnelly, Centerport, NY

BOOK REVIEW

Title: Learning TIMEX/Sinclair BASIC
Author: David A. Lien
Publisher: CompuSoft Publishing
535 Broadway
El Cajon, CA 92021
Price: \$14.95 ppbk., 327 pps.

Far outdistancing the competition, Lien breaks away from the ZX/TS book pack with this stellar tutorial work. Like a breath of fresh air, Lien brings his expertise to Timex after success with IBM, TRS-80 and EPSON literature.

Lien flavors his tutorial with simple, clear explanations (a technophile's dream), humor and reassurance. A friend who had never laid eyes on a Timex computer wrote programs to balance checkbooks and evaluate geometric functions within a few hours of opening the book. Perhaps more importantly, she felt comfortable with her ZX/TS. Lien's book answered all her questions, compared with the uncertainties found in other ZX/TS books.

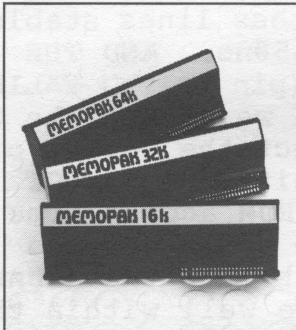
Learning covers complete BASIC concepts, and includes useful facts for beginners about cassette use, debugging simple programming mistakes and video display problems. Lien does not cover machine code or hardware modifications. The book contains 38 chapters of "Computer Assisted Instruction." Chapters include cartoons, user-friendly instruction, self-checking exercises and summaries.

Despite its simplicity, young children may find the book's language a bit over their heads (although they'll love the cartoons). It seems geared towards adults who like clear explanations.

CompuSoft and Lien's attention to layout created an easy-to-take visual appeal. They used lots of white space and big (9x7") pages. A keyboard diagram shows key functions with the type styles that represent them.--LFV

TIMEX MAKES THE COMPUTER, BUT WE MAKE IT TICK.

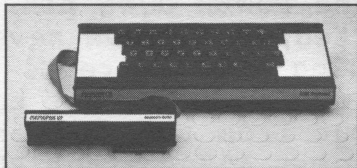
If you own a TS-1000 or ZX-81 computer and want to bring out the power within it, you'll want Memotech. From easier input to high quality output and greater memory, Memotech makes the add-ons you demand. Every Memotech peripheral comes in a black anodized aluminum case and is designed to fit together in "piggy back" fashion enabling you to continue to add on and still keep an integrated system look.



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software, enables TS-1000 users to perform complex number crunching routines with ease. With the 64K RAM a table of up to 7000 numbers with up to 250 rows or 99 columns can be specified. Quick revisions can be achieved by entering new data to your formula.

MEMOTECH KEYBOARD For ease of operation, the Memotech keyboard is a high quality standard typewriter keyboard, with TS-1000 legends. The keyboard is cable connected to a buffered interface which is housed in a standard Memopak case and plugs directly into the back of the



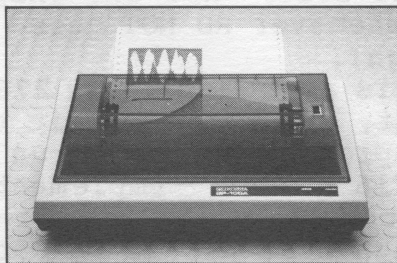
TS-1000 or other Memopaks. **MEMOPAK HRG** The Memopak High Resolution Graphics, with up to 192 by 248 pixel resolution, enables display of high resolution "arcade game" style graphics through its resident 2K EPROM, programmed with a full range of graphics subroutines.

CENTRONICS PARALLEL AND RS232 INTERFACES

Memotech's Interfaces enable your TS-1000 to use a wide range of compatible printers. The resident software in the units gives the

complete ASCII set of characters. Both Memopak Interfaces provide lower case character capabilities and up to 80 column printing. The RS232 Interface is also compatible with modems and terminals.

SEIKOSHA GP 100A PRINTER The Seikosha GP 100A uses a 5x7 dot matrix printing format with ASCII standard upper and lower case character set. Printing speed is 30 characters/second with a maximum width of 80 characters. The printer uses standard fanfold paper up to 9-1/2 inches wide. The GP 100A is offered as a package including cable and



interface. Other printer packages are also available through Memotech.

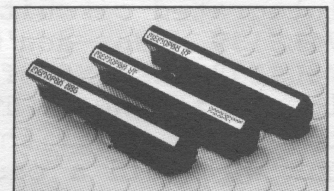
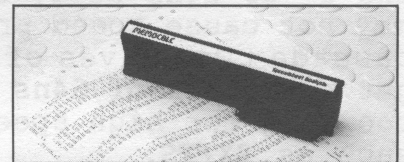
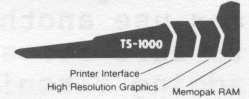
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Name _____		Phone number _____	
Address _____			
City _____		State _____ Zip _____	

ANOTHER LOOK AT 450ns EPROMS VS. THE ZX81/TS1000

Paul Hunter's comments on using 450ns EPROMs on ZX/TS computers (May83) strike me as true but incomplete. Paul shows how to add a flip-flop to delay the computer by inserting wait states and thus make the computer read slow EPROMs. You can use another chip select scheme to cure access problems without adding circuitry or slowing down your computer.

Hunter correctly points out the increased circuit propagation delays. The maximum delay from address set-up to output on the LS139 is 27ns, according to Fairchild's TTL data book. The maximum delay from ENABLE NOT to output is 24ns. From this, we can say while the 27 or 24ns delay of one device may not cause speed problems, if we cascade two halves of an LS139, we get a maximum of 54ns delay--much too long for high speed computers such as ZX/TS.

Every designer must partially solve this problem by avoiding cascading (connecting in series) LSI integrated circuits such as the 74LS139. So--don't cascade! Use a 74LS138 instead of 74LS139s, and do it all at once. The delays through the LS139 equal those in the LS138, but we avoid a cascade; it's a 3-to-8 decoder, not 2-to-4.

Hunter did not consider the RC delay, composed of the 470-Ohm resistors in the ZX/TS data lines and the capacitance of the Z80 CPU and ULA chip data pins. Without knowing the data pin capacitance, you can't compute the delays this network causes data going to the CPU. But you'll get 5ns delay for each 10pF of input capacitance.

I experience no access problems with the 2716 reader from SQ, using 450ns EPROMs. My board works without fail on my ZX80 with 450ns 2716s, even with the buffer circuit shown in SQ causing additional delays to all signals.

But I did run into the problem on my 2764 reader (to appear in a future SQ). There, I solved the problem on a design level.

Rather than paying the price of extra wait states and hardware, thus slowing the computer, we can change the way we decode and pay with more current drain.

According to the AMD2716 data sheet, the access time from CE NOT (pin 18) to valid data is 450ns. The time from address lines stable to valid data is 450ns. AND THE TIME FROM OE NOT (pin 20) TO VALID DATA IS 120ns! If we ground the CE NOT pin, and connect the output of our decoding circuitry to OE NOT alone, then the EPROM access time is 450ns after the address lines are stable. This brings the 450ns EPROM's access time well within the correct range for a Z80 running at 3.25 Mhz. You won't find any speed problems connecting the EPROM this way, the fastest way to operate it.

Current drawn by the EPROM almost doubles, because the CE NOT input is also the POWER DOWN pin. If always selected, the EPROM never powers down, using more current.

If we tie the CE NOT input to the RD NOT output from the Z80, the access time becomes 450ns after RD NOT goes active. If connected this way, you could say that ALL delays from our decoding circuitry become cancelled, since the 120ns response from the OE NOT is so fast that the delays play no role. Now the chip powers down whenever RD NOT goes inactive (high).

I use this approach on my 2764 reader circuit, and recommend it to solve access problems you may run into on my 2716 reader. Implement it easily on the reader by removing the feedthrough near pin 18 on each EPROM socket, jumpering all 4 pin 18s together, and then tying this to pin 3 of U1 (RD NOT). Current drawn by these EPROMs increases about 15mA each.

John Oliger, Indianapolis, IN

ZX/TS WEATHER FORECAST--8K/16K

Forecast tomorrow's weather, and calculate actual temperatures based on wind chill and humidity readings with this easy-to-use program. GOTO 2200 to self-SAVE under "WEATHER". The display presents four options: WEATHER FORECAST, WIND CHILL CHART, HUMIDITY INDEX, and MILLIBARS CONVERSION CHART.

WEATHER FORECAST predicts tomorrow's weather from your inputs of wind direction and barometric pressure. The program text clearly explains its limits as only a general guide to one day's weather. Forecasts apply to the northern hemisphere only. Accuracy may vary slightly by region, with somewhat truer predictions for the northeast section of the country. For example, winds off water may create a greater storm threat than winds off land, despite wind direction. WEATHER FORECAST includes detailed storm warnings if indicated by weather conditions.

WIND CHILL CHART presents a graph with temperature readings horizontally and wind speed vertically. Using these numbers, plot a point on the graph which tells you how cold it feels outside with the wind chill factor.

HUMIDITY INDEX displays a graph with temperature readings horizontally and humidity percentage vertically. Find the apparent outside temperature just as in WIND CHILL CHART.

MILLIBARS CONVERSION CHART lists inches and corresponding millibar units. Meteorologists sometimes measure barometric pressure in millibars, which you convert to inches for use in this program.

After you complete each option, hit RUN to go back to the menu. Options #2-4 explain this; option #1 does not.

Wesley Mallory, Marlboro, MA
Larry Grillo, Southboro, MA

```

1 REM "WEATHER"
5 REM MALLORY/GRILLO
10 FAST
25 PRINT "TS/1000 WEAT
WEATHER FORECAST"; TAB 11;"SE
LECT ONE"; WEATHER FOREC
AST"; WIND CHILL CHART";
HUMIDITY INDEX";
MILLIBARS CONVERSION CHART"
50 INPUT M
55 CLS
60 IF M=1 THEN GOTO 75
62 IF M=2 THEN GOTO 1900
64 IF M=3 THEN GOTO 2000
66 IF M=4 THEN GOTO 2100
67 IF M<1 OR M>4 THEN GOTO 170
0
80 PRINT "THIS PROGRAM I
S NOT INTENDED TO "; "FORECAST EV
ERY POSSIBLE WEATHER "; "CONDITIO
N. IT IS INTENDED TO BE "; "ONLY
A GENERAL GUIDE."; "WHEN THIS
PROGRAM IS RUN IN THE "; "EARLY
EVENING, THE FORECAST WILL"; "BE
VALID FOR THE FOLLOWING "; "DAY
ONLY UNLESS OTHERWISE STATED."
TAB 8;"PRESS ENTER WHEN RE
ADY"
97 PAUSE 4E4
99 CLS
105 PRINT "ENTER WIND DIRECTION
"; "CALM"; "NORTH"
"; "NORTHEAST"; "EAST"
"; "SOUTHEAST"; "SOU
TH"; "SOUTHWEST"; "W
EST"; "NORTHWEST"
195 INPUT W
    
```

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```

199 CLS
205 PRINT "ENTER BAROMETRIC C
ONDITION"
210 GOSUB 300
215 PRINT "30.5 OR HIGHER
" " STEADY OR RISING"
220 GOSUB 300
225 PRINT "30.
5 OR HIGHER"
230 PRINT "FALLING"
235 GOSUB 300
240 PRINT "30 TO 30.5"
245 PRINT "STEADY OR RIS
ING"
250 GOSUB 300
255 PRINT "30 TO 30.5"
260 PRINT "FALL
ING"
265 GOSUB 300
270 PRINT "29.5 TO 30"
275 PRINT "STE
ADY OR RISING"
280 GOSUB 300
285 PRINT "29.5 TO 30"
290 PRINT "FALLING"
295 GOSUB 300
300 PRINT "29.4 OR LOW
ER"
305 PRINT "STEADY OR RISING"
310 GOSUB 300
315 PRINT "29.4 OR LOWER"
320 PRINT "FALLING"
325 INPUT B
330 CLS
340 IF W=1 AND B=1 OR W=1 AND B
=2 OR W=1 AND B=3 OR W=1 AND B=4
OR W=1 AND B=5 OR W=2 AND B=1 OR
W=2 AND B=2 OR W=2 AND B=3 OR W=
2 AND B=4 OR W=2 AND B=5 OR W=3 AND B=1 OR W=
3 AND B=2 OR W=3 AND B=3 OR W=3 AND B=4 OR W=
3 AND B=5 OR W=4 AND B=1 OR W=4 AND B=2 OR W=4 AND B=3 OR W=4 AND B=4 OR W=4 AND B=5 OR W=5 AND B=1 OR W=5 AND B=2 OR W=5 AND B=3 OR W=5 AND B=4 OR W=5 AND B=5 OR W=6 AND B=1 OR W=6 AND B=2 OR W=6 AND B=3 OR W=6 AND B=4 OR W=6 AND B=5 OR W=7 AND B=1 OR W=7 AND B=2 OR W=7 AND B=3 OR W=7 AND B=4 OR W=7 AND B=5 OR W=8 AND B=1 OR W=8 AND B=2 OR W=8 AND B=3 OR W=8 AND B=4 OR W=8 AND B=5 OR W=9 AND B=1 OR W=9 AND B=2 OR W=9 AND B=3 OR W=9 AND B=4 OR W=9 AND B=5 THEN GOTO 1000
425 IF W=6 AND B=3 OR W=6 AND B
=5 OR W=6 AND B=7 OR W=7 AND B=3
OR W=7 AND B=5 OR W=7 AND B=7 T
HEN GOTO 1100
430 IF W=1 AND B=7 OR W=2 AND B
=3 OR W=2 AND B=4 OR W=2 AND B=5
OR W=2 AND B=7 OR W=3 AND B=3 OR
W=3 AND B=4 OR W=3 AND B=5 OR
W=3 AND B=7 OR W=4 AND B=3 OR W=
4 AND B=5 OR W=4 AND B=7 OR W=5
AND B=3 OR W=5 AND B=5 OR W=5 AN
D B=7 OR W=6 AND B=5 OR W=6 AND B=
7 OR W=9 AND B=5 OR W=9 AND B=
7 THEN GOTO 1200

```

```

435 IF W=2 AND B=6 OR W=3 AND B
=6 OR W=6 AND B=4 OR W=7 AND B=4
OR W=8 AND B=4 OR W=9 AND B=4 T
HEN GOTO 1300
440 IF W=1 AND B=6 OR W=4 AND B
=4 OR W=4 AND B=6 OR W=5 AND B=4
OR W=5 AND B=6 OR W=6 AND B=6 O
R W=7 AND B=6 OR W=9 AND B=6 THE
N GOTO 1400
445 IF W=1 AND B=8 OR W=2 AND B
=8 OR W=4 AND B=8 OR W=5 AND B=8
OR W=6 AND B=8 OR W=8 AND B=6 O
R W=9 AND B=8 THEN GOTO 1500
450 IF W=3 AND B=8 OR W=7 AND B
=8 OR W=8 AND B=8 THEN GOTO 1600
520 IF W<1 OR W>9 THEN GOTO 173
0
540 IF B<1 OR B>8 THEN GOTO 176
0
1000 PRINT
1010 GOSUB 2191
1030 PRINT "FAIR FOR SEVER
AL DAYS."
1060 STOP
1100 PRINT
1110 GOSUB 2191
1130 PRINT "FAIR - TURNING W
ARMER."
1150 STOP
1200 PRINT
1210 GOSUB 2191
1230 PRINT "FAIR - TURNING
COOLER."
1250 STOP
1300 PRINT
1310 GOSUB 2191
1330 PRINT "OVER
CAST"
1350 STOP
1400 PRINT
1410 GOSUB 2191
1430 PRINT "OVERCAST - CHA
NCE OF LIGHT"
1450 STOP
1500 PRINT
1510 GOSUB 2191
1530 PRINT "MODERATE PRECI
PITATION."
1550 STOP
1600 PRINT
1610 GOSUB 2191
1640 PRINT "SEVERE STORM W
ARNING"
1675 STOP
1700 PRINT
1705 GOSUB 2193
1715 PRINT "ENTER ONLY 1
-4 FOR THE MAIN MENU"
1725 STOP
1730 PRINT
1735 GOSUB 2193
1745 PRINT "ENTER ONLY 1
-9 FOR WIND"
1750 PRINT "ENTER RUN TO START OVER."

```

```

1758 STOP
1760 PRINT
1765 GOSUB 2193
1775 PRINT
1775 PRINT "ENTER ONLY 1
-8 FOR BAROMETRIC", "CONDITION"
"ENTER ESC TO START OVER"
1790 STOP
1900 PRINT AT 2,9;"WIND CHILL CH
ART";AT 4,11;"TEMPERATURE";AT 6,
9;"40 30 20 10 0 -10";AT 8,
2;"W";AT 9,2;"I";AT 10,2;"N";AT
11,2;"D";AT 13,2;"S";AT 14,2;"P"
;AT 15,2;"E";AT 16,2;"E";AT 17,2
;"D";AT 17,13;"WIND CHILL"
1910 PRINT AT 9,6;"5";AT 10,5;"5
0";AT 11,5;"15";AT 12,5;"20";AT
13,5;"25";AT 14,5;"30";AT 15,5;"
35";AT 9,9;"37";AT 10,9;"28";AT
11,9;"22";AT 12,9;"18";AT 13,9;"
16";AT 14,9;"13";AT 15,9;"11"
1920 PRINT AT 9,12;"27";AT 10,12
;"16";AT 11,13;"9";AT 12,13;"4"
;AT 13,13;"0";AT 14,12;"-2";AT 15
,12;"-4";AT 9,16;"15";AT 10,17;"
4";AT 11,16;"-5";AT 12,16;"-10"
;AT 13,16;"-15";AT 14,16;"-18";AT
15,16;"-20"
1930 PRINT AT 9,21;"6";AT 10,20;
"-9";AT 11,20;"-18";AT 12,20;"-2
6";AT 13,20;"-29";AT 14,20;"-33"
;AT 15,20;"-35";AT 9,24;"-5";AT
10,24;"-21";AT 11,24;"-36";AT 12
,24;"-39";AT 13,24;"-44";AT 14,2
4;"-48";AT 15,24;"-49";AT 9,28;"
-15";AT 10,28;"-33";AT 11,28;"-4
5";AT 12,28;"-53";AT 13,28;"-59"
;AT 14,28;"-63";AT 15,28;"-67";A
T 20,2;"ENTER ESC TO RETURN TO M
ENU"
1970 STOP
2000 PRINT AT 2,5;"RELATIVE HUMI
DITY INDEX";AT 4,9;"AIR TEMPERAT
URE";AT 6,7;"75 80 85 90 95
100";AT 8,1;"H";AT 9,1;"U";AT 1
0,1;"M";AT 11,1;"I";AT 12,1;"D"
;AT 13,1;"I";AT 14,1;"T";AT 15,1;
"Y";AT 8,3;"10";AT 9,3;"20";AT 1
0,3;"30";AT 11,3;"40";AT 12,3;"5
0";AT 13,3;"60";AT 14,3;"70";AT
15,3;"80";AT 16,3;"90";AT 17,2;"
100";AT 18,9;"APPARENT TEMPERATU
RE"
2010 PRINT AT 8,7;"70";AT 9,7;"7
2";AT 10,7;"73";AT 11,7;"74";AT
12,7;"75";AT 13,7;"76";AT 14,7;"
77";AT 15,7;"78";AT 16,7;"79";AT
17,7;"80";AT 8,11;"75";AT 9,11;
"77";AT 10,11;"78";AT 11,11;"79"
;AT 12,11;"81";AT 13,11;"82";AT
14,11;"85";AT 15,11;"86";AT 16,1
1;"88";AT 17,11;"91"
2020 PRINT AT 8,15;"80";AT 9,15;
"82";AT 10,15;"84";AT 11,15;"86"
;AT 12,15;"88";AT 13,15;"90";AT
14,15;"93";AT 15,15;"97";AT 16,1
4;"102";AT 17,14;"108";AT 8,19;"
85";AT 9,19;"87";AT 10,19;"90";A
T 11,19;"93";AT 12,19;"96";AT 13
,18;"100";AT 14,18;"106";AT 15,1
8;"113";AT 16,18;"122"

```

```

2040 PRINT AT 8,23;"90";AT 9,23;
"93";AT 10,23;"96";AT 11,22;"101
";AT 12,22;"107";AT 13,22;"114"
;AT 14,22;"124";AT 15,22;"136";AT
8,26;"95";AT 9,26;"99";AT 10,27
;"104";AT 11,27;"110";AT 12,27;"
120";AT 13,27;"132";AT 14,27;"14
4";AT 20,2;"ENTER ESC TO RETURN
TO MENU"
2090 STOP
2100 PRINT AT 1,4;"MILLIBARS CON
VERSION CHART";" INCHES";"
MILLIBARS";TAB 4;"29.06";TA
6 19;"984";TAB 4;"29.15";TAB 19
;"987";TAB 4;"29.24";TAB 19;"99
0";TAB 4;"29.50";TAB 19;"999"
;TAB 4;"29.68";TAB 19;"1005";TAB
4;"29.94";TAB 19;"1014";TAB 4;
"30.03";TAB 19;"1017";TAB 4;"30
.21";TAB 19;"1023";TAB 4;"30.30
";TAB 19;"1026";TAB 4;"30.39";T
AB 19;"1029";TAB 4;"30.56";TAB
19;"1035";TAB 4;"30.74";TAB 19;
"1041";TAB 4;"30.92";TAB 19;"10
47";"ENTER ESC TO RETURN TO M
ENU"
2190 STOP
2191 PRINT " F O R E C A S T
"
2192 RETURN
2193 PRINT " INVALID ENTRY"
2194 RETURN
2200 SAVE "WEATHER"
2300 GOTO 1
2310 RUN 2200
SYNTACTIC SUM: 30203, 8K ROM

```

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SUPER JOYSTICK

Keyboard scanning routines for joysticks given by Dave Straub in SYNTAX (Jun.82) and Dan Tandberg in SQ (Summer83) use only one code value at a time. I soon discovered I couldn't move and shoot at once, nor move diagonally with any facility. I used some readily available hardware to create a full-function joystick compatible with my ZX81.

Expensive components--about \$75--make up a big disadvantage to this system. Its great advantage--no modification of your computer, the joystick or the board--a totally modular approach. The computer stays hardware-independent of the joystick, you can use the BB-1 module for other jobs when not in use as a joystick port and you can also use the joystick with your Atari.

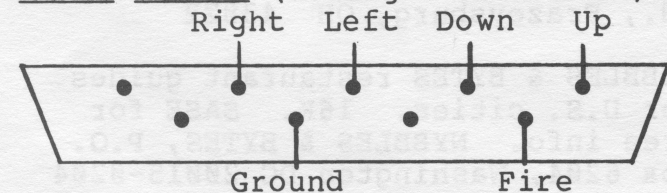
Contact-type joysticks (like Atari's) use a ground line, four contacts for direction, and a fire button. Except for the pinout, Odyssey and Interact joysticks work the same way.

You wire the ground directly, so in order to independently sense the remaining functions, you need only five bit-sized inputs. I used five bits of the input port on Byte-Back's BB-1 I/O module to read the five button contacts. The BB-1 puts the 8 bits from its input port into memory address 32764 to store the joystick status exactly.

Just plug the BB-1 module into the back of your ZX/TS.

Make an adaptor and extension cord using Radio Shack connectors and ordinary 6-conductor telephone wire. Connect a 9-pin D-connector to a 44-pin edge connector to fit the input side of the BB-1 board.

Atari Pinout (facing solder side)



Pinout of Connections to BB-1				
I/O	DATA	BINARY	DEC	DIRECTION
PIN	LINE	VALUE	VAL	COMMAND
19B	D7	01000000	128	Fire
11B	D4	00001000	8	Right
9B	D3	00000100	4	Left
7B	D2	00000010	2	Down
4B	D1	00000001	1	Up
22B	Ground			
	D5,6,8	Not Used		

PEEK 32764 reveals joystick position. One position represents up to three moves. For example, with the stick pushed up and right and the fire button pushed, you read: 128(fire)+8(right)+1(up)=137.

Test the joystick by RUNNING the following program. Move the joystick and the cursor follows. Press the fire button and a message prints on the screen.

Paul Donnelly, Centerport, NY

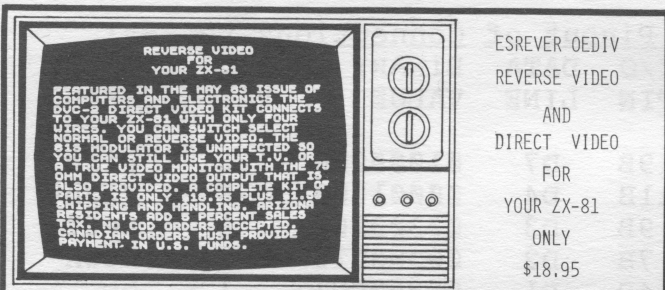
```

10 LET A=10
20 LET B=10
30 LET AW=PEEK 32764
35 PRINT AT 1,1;" "
40 IF AW>=128 THEN GOTO 1000
50 IF AW=1 OR AW=5 OR AW=9 THE
N LET B=B-1
60 IF AW=2 OR AW=6 OR AW=10 TH
EN LET B=B+1
70 IF AW=4 OR AW=8 OR AW=10 THE
N LET A=A-1
80 IF AW=3 OR AW=7 OR AW=10 TH
EN LET A=A+1
100 PRINT AT B,A;" "
120 GOTO 30
1000 REM **FIRE**
1010 PRINT AT 1,1;"FIRE"
1020 LET AW=AW-128
1030 GOTO 50
SYNTACTIC SUM: 25758 8K ROM

```

Parts	Part #	Vendor	Price
Joystick	CX-40	Atari	\$ 7.50
9-Pin D			
Plug	276-1537	RS	1.99
9-Pin			
Hood	276-1539	RS	2.19
44-pin Edge			
Conn.	276-1551	RS	2.99
6 Conductor			
Wire (8')	8778	Meshna	4.00
I/O Module	BB-1	Byte-Back	59.00

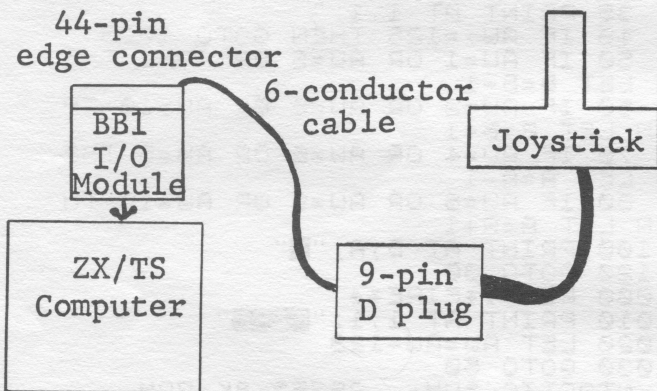
Turn page for project diagram



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